

COASTAL CONSERVANCY

Staff Recommendation
May 24, 2012

SEA OTTER RECOVERY – SHARK BITE MORTALITY STUDY

Project No. 08-079-02
Project Manager: Trish Chapman

RECOMMENDED ACTION: Consideration and possible authorization to provide up to \$60,000 to the Regents of the University of California, Santa Cruz, to undertake a study to examine potential risk factors for shark-bite mortality in southern sea otters.

LOCATION: Nearshore waters from southern San Mateo County to northern Santa Barbara County

PROGRAM CATEGORY: Integrated Coastal and Marine Resources

EXHIBITS

Exhibit 1: [Project Location and Site Map](#)

Exhibit 2: [Project Letters](#)

RESOLUTION AND FINDINGS:

Staff recommends that the State Coastal Conservancy adopt the following resolution pursuant to Section 31220 of the Public Resources Code:

“The State Coastal Conservancy hereby authorizes the disbursement of up to sixty thousand dollars (\$60,000) to the Regents of the University of California, Santa Cruz (UCSC), to undertake a study to examine potential risk factors for mortality in southern sea otters due to shark attacks, subject to the condition that, prior to the disbursement of any funds, UCSC shall submit for the review and written approval of the Executive Officer of the Conservancy a work program, including scope of work, budget and schedule.”

Staff further recommends that the Conservancy adopt the following findings:

“Based on the accompanying staff report and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed project is consistent with the current Project Selection Criteria and Guidelines.
2. The proposed authorization is consistent with the purposes and objectives of Chapter 5.5 of Division 21 of the Public Resources Code, regarding Coastal and Marine Resource Protection.”

PROJECT SUMMARY:

The proposed project will provide a \$60,000 grant to undertake a study examining the potential risk factors for shark-related mortality in southern sea otters and the interrelationships between shark attacks and factors that affect sea otter health. The study will be overseen by researchers at the University of California, Santa Cruz (UCSC), in collaboration with the U.S. Geological Survey, U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Game (CDFG), the Monterey Bay Aquarium, and others from the southern sea otter research alliance.

Southern sea otters (*Enhydra lutris nereis*), currently inhabit near-shore marine environments from San Mateo to Santa Barbara Counties. They were hunted to near extinction in the early part of the 20th century, and listed as a federally threatened species in 1977. The population currently numbers between 2,000 and 2,700 animals, far below the recovery levels originally projected -- around 13,000 animals. In recent years, multiple organizations have studied to better understand otter population dynamics and the causes of early mortality and low birth rates.

In 2008, the Conservancy funded a three year study led by UCSC investigating the impact of coastal contaminants and anthropogenic (human-caused) stressors on southern sea otters to identify factors preventing sea otter populations from expanding to optimum levels. Preliminary evidence had suggested that a high percentage of sea otter deaths were the result of infectious diseases, parasites and toxins, many of which stem from human-related activities.

The results of this research revealed a sharp increase in the frequency of lethal shark attacks on sea otters in recent years. The proportion of recovered carcasses with shark bite as the primary cause of death has risen from less than 10% from 1983 to 2001 to 30-40% from 2006 to 2011. This is unprecedented in over 35 year's data collection. In various parts of California, particularly in southern portions of the sea otter range (Estero Bay to Pismo Beach), a population viability model indicates that shark bite mortality has become the single biggest driver of population trends. This perplexing and unexpected trend has created a pressing need to better understand the cause of this pattern and to identify the risk factors that predispose sea otters to death from shark attack. Elucidation of the environmental, spatial/temporal, and health-related risk factors for shark attacks will help state, federal and local management agencies take appropriate management actions.

The proposed study will describe seasonal and spatial clusters of shark mortality and test for correlations between the relative frequency of shark bitten carcass recoveries and potential environmental/ecological predictive variables, including a) proximity to pinniped haul-outs or rookeries, b) timing of pinniped life history events, and c) timing and location of documented harmful algal blooms. The study will also evaluate two groups of randomly-selected otter carcasses from an existing database: 30 otters with confirmed shark bites (test group) and 30 otters that died from other causes (control group). The two groups will be tested for significant association between cause of death (test vs. control) and predictive risk factors including diet composition, the presence of brain lesions, and previous exposure to factors associated with brain disease. The research will evaluate what factors are making sea otters less able to avoid shark bites (for instance dementia caused by toxic algal blooms or other causes). The findings will be presented in a final report analyzing the animal risk factors for shark-bite mortality. The

report will be shared with DFG, FWS, and other organizations working to promote otter recovery.

UCSC operates the Long Marine Lab and will utilize this resource for data analyses and other aspects of the study. The study team consists of experts in ecology, evolutionary biology and marine wildlife. It includes researchers from UCSC, the Department of Fish & Game, the U.S. Geological Survey and the Monterey Bay Aquarium.

Site Description: Although historically ranging from Oregon to Baja, southern sea otters are currently found only from Pt. Conception in Santa Barbara County to just below Half Moon Bay in San Mateo County. Inhabiting rocky, sandy, and mixed shores, they are most common in near shore areas with large kelp beds. They are generally found in water depths of sixty-five feet or less, facilitating foraging along the ocean floor. Otter carcasses will be collected from throughout their current range.

Project History: In the 1700s, sea otters ranged from Baja California along the west coast of the United States into Alaska and around the Pacific to the eastern coast of Russia and down into Japanese waters. Relentlessly hunted for their luxuriant fur, by the early 1900's southern sea otters (those previously found from Baja California to the Pacific Northwest) were believed extinct. In 1938 about fifty animals were unexpectedly discovered along the Big Sur coast.

In 1972, Congress passed the Marine Mammal Protection Act prohibiting the taking of any protected marine mammal, including the southern sea otter. In 1977, the animal was placed on the federal endangered species list as a threatened species, and in 1982, the U.S. Fish & Wildlife Service released a sea otter recovery plan. At that time, resource managers predicated that the southern sea otter population would rebound to about 13,000 animals. Throughout the 1980s and early 90s, the population grew at a healthy rate of about five to seven percent a year and by the mid-1990s population levels had reached about 2,000 animals. Shortly thereafter, however, managers noted a worrisome slow-down in population growth, and in more recent years, no growth at all.

Concerns about stagnation of the sea otter population prompted environmental groups to lobby for legislation to address this problem. In 2006, the California legislature passed AB 2485 which focuses on sea otter mortality. Among other provisions, this bill makes recommendations regarding, or prohibits the disposal of substances known or believed to have deleterious effects on fish, plant life, mammals or bird life in state waters. (Fish and Game Code sec. 5650(a)(6)). Additionally, the bill established the California sea otter tax check-off fund (see Project Financing below) to allow taxpayers to easily contribute to funding solutions to this problem.

Since 2008, the Conservancy has provided just over \$540,000 of sea otter tax check-off funds for studies to better understand the causes of high mortality and low birth rate in southern sea otters. The proposed study evolved from the unexpected findings regarding significant increases in sea otter mortality from shark bites.

PROJECT FINANCING

Coastal Conservancy

\$60,000

The anticipated source of Conservancy funds for this project is an appropriation from the California Sea Otter Fund. Established in 2006, the California Sea Otter Fund is an income tax check-off program allowing taxpayers to dedicate funds to facilitate sea otter recovery. (Revenue and Taxation Code §18750) The funds may be used for “research, science, protection projects or programs related to the Federal Sea Otter Recovery Plan or improving the nearshore ocean ecosystem, including, but not limited to, program activities to reduce sea otter mortality” (RTC§18754.2(3)). This project is consistent with the requirements of the California Sea Otter Fund in that it will focus on the causes of southern sea otter mortality in order to identify possible management strategies to reduce sea otter mortality from sharks. Section 18754.2(3)(b) requires the Conservancy to solicit available federal, private, matching, and other dollars to maximize or leverage funds benefitting sea otters. CDFG will provide approximately \$145,000 in-kind staff and laboratory resources. UCSC and the Monterey Bay Aquarium will also provide in-kind staff assistance.

CONSISTENCY WITH CONSERVANCY’S ENABLING LEGISLATION:

This project would be undertaken consistent with Division 21, Chapter 5.5 (Coastal and Marine Resources) of the Conservancy’s enabling legislation (Public Resources Code § 31220).

Under Section 31220 of the Public Resources Code, the Conservancy may undertake water quality and living marine resource protection projects that meet any of the objectives specified in subsection (b) of that section. Section 31220(b)(5) states that the Conservancy may undertake a project that “provides for monitoring and mapping of coastal currents, marine habitats, and marine wildlife, in order to facilitate the protection and enhancement of resources within the coastal zone. A project considered under this paragraph shall be implemented in consultation with the Department of Fish and Game.” Consistent with this section, the proposed project will provide for monitoring of southern sea otter to facilitate their protection and enhancement within the coastal zone. The Department of Fish and Game (CDFG) has been consulted with regard to this project, as required by Section 31220(b)(5), and will provide in-kind contributions of staff time and laboratory resources.

As required by 31220(c), the project includes a monitoring and evaluation component. The project addresses a marine species and thus is not directly addressed in local watershed management plans. Conservancy staff has consulted with the State Water Resources Control Board (RWQCB) in the development of this project in order to ensure consistency with the Clean Beaches Program under Chapter 3 of Division 20.4 of the Public Resources Code.

**CONSISTENCY WITH CONSERVANCY'S 2007
STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):**

Consistent with **Goal 6, Objective 6A** of the Conservancy's 2007 Strategic Plan, the proposed project will result in the completion of a study to evaluate the underlying causes of increased otter shark-bite mortality and thus provide insight on how to improve conditions that will contribute to sea otter recovery.

**CONSISTENCY WITH CONSERVANCY'S
PROJECT SELECTION CRITERIA & GUIDELINES:**

The proposed project is consistent with the Conservancy's Project Selection Criteria and Guidelines, last updated on November 10, 2011, in the following respects:

Required Criteria

1. **Promotion of the Conservancy's statutory programs and purposes:** See the "Consistency with Conservancy's Enabling Legislation" section above.
2. **Consistency with purposes of the funding source:** See the "Project Financing" section above.
3. **Support of the public:** The proposed research is supported by U.S. Fish and Wildlife Service, the U.S. Geological Survey, the California Department of Fish and Game, the Monterey Bay Aquarium, and the State Water Quality Control Board.
4. **Location:** The proposed project would be located within the coastal zone of San Mateo, Santa Cruz, Monterey, San Luis Obispo and Santa Barbara Counties.
5. **Need:** Funds for this project will be derived from monies appropriated to the Conservancy from the Sea Otter Recovery Fund. On its own, UCSC does not have sufficient funds to undertake this study.
6. **Greater-than-local interest:** The southern sea otter is a federally listed threatened species. Like all threatened and endangered species, the otter's recovery is of great significance, both from a biological and cultural perspective. As a sentinel species in the food chain, the sea otter is a measure of the entire marine ecosystem. Thus, sea otter recovery is an important component of marine resource restoration and protection overall. Additionally, because of its preferred habitat in near shore kelp beds, and its habit of feeding on the surface of the water, the sea otter is highly visible from the shore. Wildlife viewing opportunities such as this attract millions of tourists. The southern sea otter exhibit at the Monterey Bay Aquarium is one of the most popular in the facility, revealing the high level of public interest in this animal.
7. **Sea level rise vulnerability:** The project is a research project that will not be affected by sea level rise considerations.

Additional Criteria

8. **Urgency:** The southern sea otter is not rebounding to levels once anticipated by resource agencies, making it the subject of great concern. If current trends continue, full recovery will be jeopardized. This study is an important step in determining the cause of sea otter population stagnation.
9. **Leverage:** See the “Project Financing” section above.
10. **Readiness:** UCSC and other team members are ready to move forward with this study immediately.
11. **Cooperation:** This project is a cooperative effort between many resource agencies and organizations focusing on sea otter health and recovery.
12. **Minimization of greenhouse gas emissions:** This research project is not expected to have any long-term greenhouse gas emissions. The project has the potential to generate short-term greenhouse gas emissions associated with vehicles used by commuting research workers, but these emissions would be limited, and not cumulatively significant.

COMPLIANCE WITH CEQA:

The proposed project is categorically exempt from review under the California Environmental Quality Act (CEQA) pursuant to 14 California Code of Regulations § 15306, which exempts basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious major disturbance to an environmental resource as part of a study leading to an action which the Conservancy has not yet approved, adopted or funded. This project will not result in a major disturbance to sea otters as only dead sea otters will be handled for the study. Upon approval, staff will file a Notice of Exemption for the project.